DEPARTMENT OF NATURAL RESOURCES

Ozone generator inspection at a public water supply system.

The Wisconsin Department of Natural Resources (DNR) establishes groundwater quality standards for the state and coordinates the implementation of ch. 160, Wis. Stats. The department works with operators of landfills, entities that land spread waste, and those that oversee remediation and redevelopment of contaminated sites, to ensure standards are met to avoid increasing the concentration of pollutants in groundwater. The DNR works with public water systems across the state to protect groundwater quality and quantity to provide safe and reliable drinking water supplies. The DNR manages groundwater quantity (ss. 281.11, 281.12, 281.34, and 281.346, Wis. Stats.). The DNR staffs the Groundwater Coordinating Council and collaborates with the UW-System on the joint solicitation for groundwater research and with the Wisconsin Geologic and Natural History Survey (WGNHS) on an annual groundwater work plan.

Fiscal Year 2022 Highlights

- The DNR continues to implement elements of the Wisconsin PFAS Action Plan. In 2022 over 120 municipal systems voluntarily sampled using EPA Method 537.1 for PFAS in Drinking Water, which detects 18 different PFAS compounds. A report of findings will be created following completion of the program. More information at https://dnr.wisconsin.gov/topic/PFAS/PWSampling. In addition, effluent at select Wisconsin Pollutant Discharge Elimination System (WPDES) permitted facilities was sampled and the department is also drawing on the examples and experiences of other states as it develops an interim plan to address PFAS that may be present in municipal wastewater treatment facilities' biosolids that are regularly applied to agricultural lands throughout the state.
- The DNR received approval to set MCLs for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS) in NR 809. These MCLs will be published in NR 809 on August 1, 2022. The MCL for PFOA and PFOS is 0.000070 mg/L (70 ppt). This level is set for the combined concentration of PFOA and PFOS.
- The DNR submitted a list of 27 substances, designated "Cycle 10," to DHS in March 2018 and also submitted a list of 40 substances, designated "Cycle 11", to the DHS in April 2019. On February 23, 2022, the Natural Resources Board considered and did not approve the Cycle 10 rule. The scope statement expired on March 3, 2022. The department is evaluating work on substances contained in Cycle 10 and have paused work on the Cycle 11 NR 140 Groundwater Pollutant Standards. At this time, rulemaking has been initiated to set a groundwater standard for E. coli and to revise the current standard for total coliform.The current status of NR 140 rulemaking can be found here: NR 140 Groundwater Quality Standards Update.

- Following the 2021 Supreme Court Decision (Clean Wisconsin, Inc., v. DNR), the DNR will continue its careful case-by-case analysis of high capacity well applications. The analysis will consider both the needs of the property and the environmental effects that the proposed high capacity well, when combined with existing environmental impacts, may have on waters of the state.
- The Drinking Water and Groundwater and Community Financial Assistance programs continue issuing grants to low-income private well owners. The grants provide funding to help replace contaminated wells or fill and seal unused wells.

Details of Ongoing Activities

The following DNR programs protect and manage groundwater:

Drinking Water and Groundwater (DG) – Regulates public water systems, private drinking water supply wells, well abandonment and high capacity wells. DG is responsible for adoption and implementation of groundwater quality standards contained in ch. NR 140, Wis. Adm. Code, and works closely with other programs and agencies to implement ch. 160, Wis. Stats., including groundwater monitoring, data management, hydrogeologic advice and staffing the Groundwater Coordinating Council. Groundwater quantity provisions (2003 Wisconsin Act 310, codified at s. 281.34, Wis. Stats. and ch. NR 820) and the Great Lakes Compact (2007 Wisconsin Act 227, codified at ss. 281.343 and 281.346, Wis. Stats.) are also implemented by DG. The program also coordinates the state's Wellhead Protection and Source Water Protection programs. See *https://dnr.wi.gov/topic/DrinkingWater, https://dnr.wisconsin.gov/topic/Wells*, *https://dnr.wi.gov/topic/Groundwater and https://dnr.wisconsin.gov/topic/WaterUse*.

Remediation and Redevelopment (RR) – Oversees response actions at spills, hazardous substance discharge sites, environmentally polluted sites, abandoned containers, drycleaners, brownfields (including grant programs that provide assistance with environmental assessment and cleanup), leaking underground storage tanks, closed wastewater and solid waste facilities, hazardous waste corrective action and generator closures and sediment cleanup actions, all of which are closely related to groundwater issues. In addition, the RR program provides temporary emergency water in instances where hazardous substances or animal waste have adversely affected private wells. See *https://dnr.wi.gov/topic/Brownfields/* and *https://dnr.wisconsin.gov/topic/cleanup*.

Waste and Materials Management (WA) – Regulates and monitors groundwater quality at proposed, active, and inactive solid waste facilities and landfills. WA reviews investigations of groundwater contamination and implementation of remedial actions at active solid waste facilities and landfills. WA also maintains a Groundwater and Environmental Monitoring System (GEMS) database of groundwater quality data from over 600 solid waste facilities and landfills and uses reports from GEMS to evaluate whether sites are adversely affecting groundwater quality. See *https://dnr.wi.gov/topic/Landfills/gems.html*.

Water Quality (WQ) - Regulates the discharge of municipal and industrial wastewater, by-product solids and sludge disposal from wastewater treatment systems and wastewater land treatment/disposal systems. WQ also issues permits for discharges associated with cleanup sites regulated by WQ for the RR program. See *https://dnr.wi.gov/topic/Wastewater* and *https://dnr.wi.gov/topic/TMDLs*.

Watershed Management (WT) – WT has primary responsibility for regulating stormwater and agricultural runoff, as well as managing waste from large animal feeding operations. See *https://dnr.wi.gov/topic/nonpoint/*, *https://dnr.wisconsin.gov/topic/cafo* and *https://dnr.wi.gov/topic/stormwater/*.

Office of Emerging Contaminants (OEC) - The Office of Emerging Contaminants (OEC) coordinates cross-program, division, and agency work around environmental contaminants and emerging topics such as PFAS. See *https://dnr.wisconsin.gov/topic/PFAS*.

Environmental Analysis and Sustainability Program (EAS) - The Environmental Analysis and Sustainability Program regulates metallic mining activity in the state. Issues related to groundwater quantity and groundwater quality are critical in determining whether a proposed mining project receives necessary approvals. See https://dnr.wisconsin.gov/topic/Mines/Metallic.html.

Drinking Water and Groundwater Program

Groundwater Quality Standards Implementation

Chapter 160, Wis. Stats., requires the DNR to develop numerous groundwater quality standards which consist of enforcement standards and preventive action limits for substances detected in, or having a reasonable probability of entering, the groundwater resources of the state. *Chapter NR 140, Wis. Adm. Code*, establishes these groundwater standards and creates a framework for their implementation. Groundwater quality standards are set for 138 substances of public health concern, eight substances of public welfare concern and 15 indicator parameter substances in ch. NR 140.

In accordance with *state groundwater law*, the DNR periodically submits a list of substances to the Department of Health Services (DHS) and requests that they review available toxicologic information and provide recommendations for new and/or revised groundwater standards. These lists submitted to DHS are designated as NR 140 "cycle" lists. The DHS then prepares and sends a Scientific Support Document back to DNR which describes the information and methodology used to develop each recommended standard.

The DNR submitted a list of 27 substances, designated "Cycle 10," to DHS in March 2018. The DHS responded with recommended standards to the DNR in June 2019. A plain language summary of each of the compounds in Cycle 10 is available at *DHS's Recommended Groundwater Enforcement Standards*. On February 23, 2022, the Natural Resources Board considered and did not approve this rule. The scope statement expired on March 3, 2022. The DNR also submitted a list of 40 substances, designated "Cycle 11", to the DHS in April 2019. The Cycle 11 list of substances includes 34 PFAS compounds detected, or potentially present, in Wisconsin groundwater. The department is evaluating

work on substances contained in Cycle 10 and have paused work on the Cycle 11 NR 140 Groundwater Pollutant Standards. At this time, rulemaking has been initiated to set a groundwater standard for E. coli and to revise the current standard for total coliform.The current status of NR 140 rulemaking can be found here: *NR 140 Groundwater Quality Standards Update*.

The DNR continues to provide training to new staff in the runoff management and drinking water programs on the implementation of groundwater quality standards, including training for land spreading discharge permit writing and animal waste drinking water well contamination response. Groundwater and runoff program staff regularly consult on groundwater quality issues that arise in agricultural and urban runoff programs. Such coordination is critical in obtaining statewide consistency on how the DNR evaluates and reduces risk of groundwater contamination associated with regulated activities.

The DNR staff actively participate on the NRCS Source Water Protection Subcommittee. This subcommittee provides guidance to state conservationists and directors on how to comply with source water protection activities contained in the 2018 Farm Bill. Activities include identifying local priority areas for source water protection and practices to address water quality and quantity threats.

Groundwater Quantity Program Implementation

The DNR is authorized under ch. 281, Wis. Stats. to regulate wells, except for a residential well or a fire protection well that has a capacity of more than 100,000 gallons per day. Such wells are defined as high capacity wells. Any well, regardless of pump capacity, on a high capacity property is considered a high capacity well. 2015 Wis. Act 177 granted an exception for wells used for residential or fire protection purposes from being considered high capacity wells effective October 1, 2016. s. 281.34(1)(b) Wis. Stats.) Since 1945, the DNR has reviewed proposed high capacity wells for compliance with applicable well construction rules to determine whether the well would impair the water supply of a public utility well. The DNR review of high capacity wells has been evolving over the last decade as described in the paragraphs below.

In May of 2004, the statutes regarding high capacity wells were expanded through 2003 Wisconsin Act 310 to give the DNR additional authority to consider environmental impacts of proposed wells when the proposed well may significantly impact a large spring, results in 95% or greater water loss, or the well is located within 1,200-feet of a trout stream, exceptional resource water or outstanding resource waters. The DNR may deny or limit an approval to assure that proposed high capacity wells do not cause significant adverse environmental impacts to these valuable water resources. The Act 310 changes are implemented primarily through ch. NR 820, Wis. Adm. Code. The DNR water use section staff implement the programs created by Act 310 including reviewing applications, managing data and collecting water withdrawal reports.

The DNR changed its procedures in July 2011 in response to a 2011 Wisconsin Supreme Court decision. In Lake Beulah Management District v. State DNR (2011), the Wisconsin Supreme Court stated that the Public Trust Doctrine is a "fundamental tenet" of the Wisconsin Constitution and that it should be broadly construed to protect public rights in navigable waters. The court held that the WDNR has "the authority and a general duty to consider potential environmental harm to waters of the state when reviewing the high capacity well permit application."

If the DNR determined the proposed well could directly result in potential environmental harm, the DNR would either deny the well application or request that an applicant modify their proposed construction or operation of the well to prevent such impacts. The DNR based the need to modify or deny an application on the projected impacts to the affected water resource, e.g., estimated reductions in stream flow or lake level, and the resultant impacts to water temperature, the fishery and other ecological aspects of the stream or lake. In conducting these assessments, the DNR considered site-specific hydrogeology, separation distance between the well(s) and the water resource, the hydrology and characteristics of potentially affected surface waters, construction details of nearby wells, characteristics of the proposed wells such as construction, pump capacity, and the water use and pumping schedule for the proposed well and any other existing wells on the property. This version of the technical review methodology was in place from July 2011 through May 2016.

In May 2016 Wisconsin Attorney General Schimmel issued a formal opinion (OAG-01-16) regarding the DNR's authority to consider environmental impacts when reviewing high capacity well applications. Attorney General Schimmel concluded that section 227.10(2m), Wis. Stats., prohibits the DNR from conducting an environmental review of a high capacity well unless it is in one of the specific categories identified in Wis. Stat. § 281.34, such as a well in a groundwater protection area; with a water loss of more than 95% of the amount of water withdrawn; or that may have a significant environmental impact on a spring (these categories are specified in Wis. Stat. § 281.34(4)); or if it may impair the water supply of a public utility (as described in Wis. Stat. § 281.34(5)). 2017 *Wisconsin Act 10* took effect on June 3, 2017. The Act amended and created several statutes pertaining to replacement, reconstruction and transfer of approved high capacity wells. The new law allows well owners to conduct these activities without the DNR approval and without paying any additional fee, provided the statutory criteria are met. Please note that Act 10 does not affect any applications or approvals required for public or community water supply systems, or school or wastewater treatment plant wells under Wis. Adm. Code Chapters *NR 810*, *811,* and *812* and this guidance do not address requirements under those chapters. Act 10 also includes a study of specific navigable water resources of the Central Sands area of Wisconsin. A report on this study was due to the legislature in June 2021.

In May 2020, Wisconsin's *Attorney General Josh Kaul issued a letter* to the DNR withdrawing a 2016 Attorney General Opinion concerning the DNR's review of high capacity well applications and the ruling of the Wisconsin Supreme Court in Lake Beulah Management District v. Wisconsin Department of Natural Resources. In response to a May 1, 2020 letter from the Wisconsin Attorney General, the DNR no longer relied on a 2016 Attorney General opinion in evaluating high capacity well applications but rather acted in accordance with the Supreme Court's decision in Lake Beulah v. Wisconsin Department of Natural Resources by considering environmental impacts on a case-by-case basis when presented with concrete, scientific evidence of potential harm.

In 2021, the Wisconsin Supreme Court considered the application of 2011 Wisconsin Act 21 to the Lake Beulah decision and DNR's authority to conduct environmental review for

all high capacity wells. In Clean Wisconsin, Inc., v. DNR (2021), the Wisconsin Supreme Court held that under the public trust doctrine, the DNR has explicit, broad authority and duty to consider environmental impact of a proposed high capacity well when presented with sufficient, concrete evidence of potential harm to waters of the state. Following the 2021 Supreme Court Decision, the DNR will continue its careful case-by-case analysis of high capacity well applications. The analysis will consider both the needs of the property and the environmental effects that the proposed high capacity well, when combined with existing environmental impacts, may have on waters of the state.

The DNR's High Capacity Well Application Review Process website (*https://dnr.wi.gov/topic/Wells/HighCap/Review.html*) describes the current technical approach.

Great Lakes Compact and Implementation of 2007 Act 227

The Great Lakes—St. Lawrence River Basin Water Resources Compact (Compact) took effect on December 8, 2008 following ratification in each of the eight Great Lakes States and Congress's consent. The water use section staff implement Compact-related programs including authorizing permits and approvals, implementing the water conservation and efficiency program, reviewing diversion applications and working in conjunction with groundwater quantity staff to collect annual water withdrawal reports.

The DNR has promulgated four administrative rules to implement the Compact and associated statewide water use legislation. Three of these rules took effect January 1, 2011: Water Use Registration and Reporting (ch. NR 856); Water Use Fees (ch. NR 850); and Water Conservation and Water Use Efficiency (ch. NR 852). The Water Use Permitting rule (ch. NR 860) took effect in December 2011. Three additional rules are still in the drafting stage. These rules include Water Supply Service Area Planning, Water Loss and Consumptive Use, and Water Use Public Participation.

In January 2018, the DNR received an application to divert water from Lake Michigan to the Village of Mount Pleasant. The Village of Mount Pleasant is partly in the Great Lakes Basin and partly in the Mississippi River Basin. Under the Great Lakes Compact, the Village of Mount Pleasant is eligible to receive a diversion of Great Lakes water if the Compact criteria for a straddling community diversion are met. The DNR approved the diversion on April 25, 2018 after holding a public comment period, public hearing and determining that the proposal met the Great Lakes Compact criteria. The diversion is approved to supply up to seven million gallons of water per day to the portion of the Village of Mount Pleasant in the Mississippi River Basin. The diversion area includes part of the area identified by Racine County as the future site of the Foxconn facility. The DNR's diversion approval was challenged on May 25, 2018 and the DNR's approval was upheld by the administrative law judge.

Water Use Registration and Reporting

Following implementation of the Compact, all new or increased withdrawers that have the capacity on their property to withdraw 100,000 gallons per day (gpd) or more for 30 days

must register with the DNR prior to withdrawing groundwater or surface water. This is typically done in conjunction with other approval or permitting procedures.

The DNR continues to upgrade water use data management systems, improve existing registration data and expand data collection methods. These efforts resulted in an increase in withdrawal report response rates from below 50% in 2008 to 79% in 2010. These improvements continued so that the reporting response rate for 2013 – 2018 is 96% annually.

Water Withdrawal Registrations by Source Type and Major Basin (2022)

	Great Lakes Basin	Mississippi River Basin	**Total**
Groundwater	3,768	10,089	13,857
Surface Water	397	687	1,084
Total	4,165	10,776	14,941

Persons with registered withdrawals must measure or estimate their monthly withdrawal volumes and report the previous calendar year's monthly water use by March 1 of each year. These reports are collected and analyzed for errors and inconsistencies. The compilation of more than five years of water use reporting data has allowed the DNR to assess trends in water use over time. Summary analysis is conducted on reported withdrawals and an annual water withdrawal reporting summary is made publicly available on the *DNR website*. Individual reports are also provided upon request to governmental partners, researchers, businesses and private individuals.

Water Conservation and Water Use Efficiency

Ch. NR 852, Wis. Adm. Code, establishes a mandatory water conservation and water use efficiency program for new or increased Great Lakes Basin surface water and groundwater withdrawals. In addition, mandatory conservation is required for any new or increased diversions of Great Lakes water and water withdrawals statewide that would result in a water loss of two million gallons or more per day. The rule identifies conservation and efficiency measures that withdrawals subject to the mandatory program must meet.

The rule helps guide a statewide voluntary water conservation and efficiency program which focuses on providing information and education, identifying and disseminating information on new conservation and efficiency measures, and identifying water conservation and efficiency research needs. The program is coordinated with the Public Service Commission and the Department of Safety and Professional Services.

Water Use Permits

Water Use Permits are required for Great Lakes Basin groundwater or surface water withdrawals averaging 100,000 gallons per day or more in any 30-day period. General permits (valid until 2036) are required for withdrawals of 100,000 gallons per day averaged over 30 days up to 1,000,000 gallons of water for 30 consecutive days. Individual permits (valid for 10-years) are required for withdrawals of 1,000,000 gallons per day or more for 30 consecutive days. Ch. NR 860, Wis. Adm. Code prescribes a review

process for the individual permits and requires additional environmental review. Since December 8, 2011, approximately 380 permits have been issued to new or increased withdrawals in the Great Lakes Basin. The original individual water use permits issued in 2011 were set to expire in December 2021. The DNR renewed 323 water use individual permits to property owners with no new or increased withdrawals since 2011, who consecutively withdraw more than 1,000,000 gallons per day. The renewed permits are valid until December 8, 2031. The DNR issued 222 water use general permits to property owners that had no change in withdrawals sources and no longer met the requirements of an individual permit. Only one property increased water use by 1,000,000 gallons per day (for 30 consecutive days over their 2011 withdrawal amount. The DNR reissued a modified water use individual permit for this property.

Water Use Fees

Wisconsin Act 28 contains statutory language directing the DNR to collect water use fees to fund Great Lakes Compact implementation and water use program development in Wisconsin. The statute directs all persons with water supply systems with the capacity to withdraw 100,000 gallons per day or more must pay an annual $125 fee per property. Act 28 also directs the DNR to promulgate a rule imposing an additional fee on Great Lakes Basin water users withdrawing more than 50 million gallons per year. That rule, ch. NR 850, Wis. Adm. Code, prescribes a tiered system for additional Great Lakes Basin fees on withdrawals exceeding 50 million gallons per year. Water use fee revenue is used to; document and monitor water use through the new registration and reporting requirements, implement the Great Lakes Compact through water use permitting and regulate diversion of Great Lakes Basin waters, help communities plan water supply needs, build a statewide water conservation and efficiency program and to develop and maintain a statewide water resources inventory.

Well Construction and Private Wells

DG sets and enforces minimum standards for well construction, pump installation and well filling and sealing through ch. NR 812, Wis. Adm. Code. The standards are intended to protect groundwater and ensure safe drinking water.

More than 10,000 new or replacement wells were constructed in Wisconsin in 2021. Advance notification to the DNR is required for all well construction. After construction, drillers submit Well Construction Reports to the DNR describing the construction of each well drilled. Private Water Supply staff enforce minimum well construction standards by conducting compliance inspections with a focus on private wells under construction, reviewing well construction reports and associated sampling results. During 2021, staff conducted 974 compliance inspections of wells under construction, and additional inspections of pump installation and well filling/sealing work. The DNR staff initiated enforcement action on multiple violations including failure to submit required reports and well drilling or pump installing without a license.

DG staff promote compliance through regular communication with drillers and pump installers, including in-person contacts, a Private Water Advisory Council with industry advisors, and a web page with industry-focused information and resources. The quarterly

"NewsBits" e-newsletter provides program updates, annual data and compliance reminders to drillers, pump installers and other interested parties.

Private Water Supply staff are often the first responders to reports of private well contamination. Well contamination by livestock waste has been an increasing problem in recent years. DG staff use field investigation and analytical tools to investigate the source of microbial contamination – known as MST (Microbial Source Tracking) sampling – and determine whether fecal contamination is due to grazing animal manure rather than human sources. Agency news releases to both the agricultural community and general media emphasize ways to avoid contamination and encourage regular sampling and well inspection by private well owners.

DG handles license renewal for well drillers, heat exchange drillers and/or pump installers each year under ch. NR 146, Wis. Adm. Code. New applicants demonstrate experience and take a one-time examination to obtain a license. New License Exam Study Guides are now available to assist applicants to prepare for the exam. All license holders must attend training each year to earn required continuing education credits. The DNR works with training providers to evaluate and approve all continuing education credits, ensuring that license holders are qualified to do their work in a way that meets standards and won't contaminate groundwater. More than 1,100 individuals hold an active Water Well Driller, Heat Exchange Driller and/or Pump Installer license in Wisconsin. During the pandemic, the DNR worked with continuing education providers to develop online training options and provided for the safe proctoring of in-person exams. The DNR has contracted with a third party to implement online examinations, which had not been an option before the pandemic. The third party examinations are conducted weekly instead of quarterly as before.

DG encourages private well owners to test their wells annually for bacteria and other contaminants of concern. DG maintains the popular webpage titled "What's Wrong with My Water?" to answer commonly-asked questions about private well water, to help well owners diagnose their aesthetic water quality problems and to provide suggested options. DG and Community Financial Assistance staff awarded a combined total of over $110,000 in well abandonment and well compensation grants in 2021. Well compensation grants provided cost-sharing funds to help six owners replace wells due to metals and other contamination. Additionally, 66 well abandonment grants were issued around the state to help fund filling and sealing of unused wells.

DG continues to develop new and enhance existing electronic tools to help well drillers, well owners and others find information and comply with well construction and well filling and sealing requirements.

The "*Well Driller Viewer*" tool provides a searchable map view of landfill setbacks, special well casing depth areas, remediation sites and other data to assist well drillers in planning projects and meeting requirements of NR 812, Wis. Adm. Code. The Well Driller Viewer – Mobile-Friendly App was added in 2019. With a few easy steps, anyone can download an app and access the Well Driller Viewer on a smartphone. The app provides screen views and easy navigation customized for mobile devices. In 2021, the Well Driller Viewer was

enhanced with improved data layers to help drillers comply with construction requirements and provide the best well water quality possible.

"*Online WCR*" is the electronic system for submitting Well Construction Reports to the DNR. Online WCR checks for common errors to make sure the report is complete and submits the data directly to the DNR without the need to send in a paper report. A similar online *Well Filling and Sealing Report* system allows contractors to submit filling and sealing reports, which are required to be submitted electronically. Both systems reduce time and errors for both well professionals and the DNR staff and result in more accurate data available more quickly.

The Well Driller Viewer was launched in 2018.

Public water systems

The DNR's Public Water Supply (PWS) program oversees the drinking water quality provided by public water systems (ch. NR 809 (Safe Drinking Water), Wis. Adm. Code). Working in cooperation with owners and operators of water systems, the PWS program ensures that samples are collected, and analyses completed to determine if the water meets federal Safe Drinking Water Act (SDWA) standards. The PWS program also regulates the operation of public water systems through ch. NR 810 and the general design and construction of community water systems through ch. NR 811 and NR 812 for non-community systems. Additionally, the PWS program works to educate water system owners and operators concerning proper operation and maintenance of water systems to ensure safe drinking water for Wisconsin consumers.

The PWS program maintains data about Wisconsin's drinking water and groundwater quality through the *Drinking Water System database*. The Drinking Water System is an important tool used to efficiently enforce SDWA regulations for public water systems. It contains the monitoring and reporting requirements for each public water system and their drinking water sampling results. It also includes violations for any missing requirements and exceedances of the maximum contaminant levels (MCLs).

The DNR maintains an electronic monthly operating report (EMOR) data system to accept and store monthly operating report data from public drinking water systems. EMOR contains required documentation of a system's operations such as monthly pumpage, chemical treatment usage, chlorine residual, turbidity and temperature. EMOR generates data reports to monitor treatment operations and make efficient water quality and quantity management decisions.

Public water systems continue to face rising nitrate levels. Community and non-transient non-community water systems must take immediate action if a nitrate MCL of 10 mg/L is observed (e.g., take well off-line, blend, treat etc.). Transient non-community systems, which include taverns, restaurants, churches and campgrounds, are required to post

notices warning customers of the exceedance and to provide bottled water to infants and pregnant women. Rising nitrate concentrations are a result of increasing concentrations in groundwater caused by land use activities and weather patterns. The public water supply program continues to work with other DNR programs and external partners to reduce nitrate in groundwater and surface water.

The PWS program is working with public water systems to implement the federal revised total coliform rule (RTCR). Wisconsin has adopted a "find-and-fix approach" so that when bacterial contamination potential is detected by the presence of total coliform, the DNR and water system operators investigate to find the cause, take action to fix it, and monitor to ensure public health protection. Among many RTCR implementation activities, water supply specialists tested new water supply sampling methods developed by the State Laboratory of Hygiene. The method will help public water systems distinguish whether the source of bacterial contamination is in the groundwater or due to a defect of the water system. For additional information about the Public Water Supply Program you can review the current *Annual Compliance Report*.

Under the Safe Drinking Water Act's fifth Unregulated Contaminants Monitoring Rule (UCMR5) select water systems will be asked to sample for 29 PFAS compounds and lithium. This will begin in 2023.

In 2022 over 120 municipal systems voluntarily sampled using EPA Method 537.1 for PFAS in Drinking Water, which detects 18 different PFAS compounds. A report of findings will be created following completion of the program. More information at *https://dnr.wisconsin.gov/topic/PFAS/PWSampling*.

The PWS program has also promulgated MCLs for perfluorooctanoic acid (PFOA) and perfluorooctane sulfonic acid (PFOS). These will be published in NR 809 on August 1, 2022. The MCL for PFOA and PFOS is 0.000070 mg/L (70 ppt). This level is set for the combined concentration of PFOA and PFOS.

Wellhead protection

The goal of Wisconsin's Wellhead Protection (WHP) program is to reduce the risk of groundwater contamination in areas contributing groundwater recharge to public water supply wells, consistent with the state's overall goal of groundwater protection. A WHP plan is required for new municipal wells and must be approved by the DNR before the new well can be used. A WHP plan is voluntary for any public water supply well approved prior to May 1, 1992. DNR promotes and encourages, but does not require, wellhead protection planning for all wells. With planning assistance from Wisconsin Rural Water Association (WRWA), 12 communities completed WHP plans this year (a total of 25 wells).

The DNR and WRWA are working together on proactive strategic interventions to support wellhead protection actions in selected communities with wells susceptible to contamination. The DNR, WGNHS, WRWA and other partners are developing and using groundwater monitoring, modelling and related tools in Spring Green and Waupaca to demonstrate a voluntary community-based approach to rising nitrate levels. In response

to contaminant plumes that have the potential to affect two municipal wells in the village of Luck, WI, the village has updated its WHP plan, participated in groundwater teacher workshops, and is evaluating new spill prevention and remediation and redevelopment opportunities with support from the DNR and WRWA.

The DNR continues to measure and report to US Environmental Protection Agency (EPA) on the percent of public water systems that are protected by substantial implementation of wellhead protection. In 2019, 40% of Wisconsin municipal public water systems were protected by implementation of a WHP plan. Over 400 communities now have a WHP plan for at least one of their wells and approximately 55% of the municipally served population is covered by source water protection plans with accompanying implementation ordinances.

The DNR maintains a *webpage* with information aimed at encouraging and supporting water utilities in protecting their water supplies from potential sources of contamination.

The DNR staff from a variety of water programs completed several collaborative projects to more effectively align management of both phosphorus and nitrogen losses to lakes, streams and groundwater. Different chemical behavior and separate Clean Water and Drinking Water federal laws make coordination somewhat challenging. Wisconsin's Nutrient Reduction Strategy and its newly-revised Nonpoint Source Program Plan now more thoroughly address both groundwater and surface water.

The DNR and WRWA staff continue to coordinate their assistance to local protection efforts. WRWA staff work on plans for individual communities and area wide plans for multiple water supply systems. DNR staff review draft plans and ordinances and provide technical advice to local officials responsible for carrying out wellhead protection.

Groundwater Information and Education

Since 1994, DNR staff have worked with the Groundwater Center at the Center for Watershed Science and Education (CWSE) and WGNHS to sponsor two groundwater workshops for teachers every year. Educators from 20 schools and nature centers are selected to attend the workshops and receive a free groundwater model for their school. Besides learning how to use the groundwater model, the educators received groundwater resources to incorporate groundwater concepts into their classroom. The intent of the workshops is to provide information for teachers to educate students – and their parents – on the importance of protecting groundwater in their own communities. With funding from an EPA WHP grant, groundwater models have been given to over 475 schools or nature centers since 2001 and nearly 900 educators have received hands-on training in using the model effectively.

Since the Groundwater Coordinating Council Report to the Legislature went online in an interactive format in 2014, web visits and time spent at the site have continued to increase. In FY19, the GCC report was accessed online over 5,000 times; in FY20, it was accessed online over 6,500 times.

Well drillers and pump installers, water testing providers, local health and conservation departments, health care providers and many individuals request and receive thousands

of printed publications on groundwater each year. Among the most-frequently requested items are: Nitrate in Drinking Water, Groundwater: Wisconsin's Buried Treasure publication, and the Groundwater Study Guide packet.

Groundwater Monitoring and Research

Chapter 160 of the Wisconsin Statutes requires the DNR to work with other agencies and the Groundwater Coordinating Council (GCC) to develop and operate a program for monitoring and sampling groundwater to determine whether harmful substances are present (s. 160.27, Wis. Stats.). The DNR has also supported groundwater monitoring studies evaluating existing design and/or management practices associated with potential sources of groundwater contamination. The intent of these studies is to reduce the impacts of potential sources of contamination by changing the way land activities may impact groundwater.

Seven *new projects* were selected through the Joint Solicitation process for funding in FY22. Final reports and 2-page research summaries are available for many projects on the *Water Resources Institute website*.

The DNR commits $100,000 annually to operate and maintain the *Wisconsin Groundwater Level Monitoring Core Network* in collaboration with USGS and WGNHS. This 'Core Network' has been in existence since 1946 and currently includes 97 long-term monitoring groundwater wells and two spring flow gages. The long-term monitoring provides data that builds the history of water levels in an area or aquifer. Uses of the data include: assessing aquifers in drought or wet conditions, assessing groundwater divides and surface water impacts, calibrating groundwater flow models and other decision-support tools, determining the relationship between water resources and withdrawals and more.

In addition to supporting the statewide groundwater level monitoring network, the DNR also supports monitoring of streams, lakes and springs to understand groundwater influences on these surface water resources. In FY21, the DNR continued monitoring reference springs, a project begun by WGNHS, continued revisiting springs in the Wisconsin Spring Inventory, and surveyed newly identified springs. As part of the Central Sands Lakes Study, the DNR added 21 project groundwater level monitoring wells – or short-term monitoring wells – to the Central Sands region.

Groundwater Data Management

The DNR's consolidated Groundwater Retrieval Network (*GRN*) accesses groundwater data from database systems in the DG, Waste & Materials Management, and Watershed Management programs, including information on approximately 300,000 wells. These wells represent public and private water supply wells, piezometers, monitoring wells, non-potable wells and groundwater extraction wells. DG staff continue to improve the locational data associated with GRN's wells and the ease with which the data can be accessed.

The DNR's high capacity well and surface water intake data continues to improve. Since the database was developed in 2007, much of the previously existing locational and ownership information has been verified or updated to improve data quality. The improved data quality has helped increase response rates on annual water withdrawal reporting.

Between 2008 and 2013, reporting response rates increased from 60% to over 95%. The online reporting system has increased reporting accessibility and improved communication with the user community.

Office of Emerging Contaminants

The Office of Emerging Contaminants (OEC) coordinates cross-program, division, and agency work around environmental contaminants and emerging topics such as PFAS. OEC staffs the Wisconsin PFAS Action Council (WisPAC), which consists of nearly 20 state agencies working to address PFAS contamination in the state. The office monitors and advises on the implementation of the PFAS Action Plan, including sampling and ongoing monitoring, development of new methods and science-based standards, and enhanced risk communication infrastructure and resources. In alignment with recommendations from the Action Plan, OEC staffs additional advisory bodies such as the PFAS External Advisory Group and the PFAS Technical Group to help foster ongoing discussion and collaboration with stakeholders.

OEC coordinates with and provides technical assistance to stakeholders across the state, including the firefighting community around PFAS-containing firefighting foam through the development of best management practices, FAQs, and other resources related to Wis. Stat. 299.48 and ch. NR 159 regarding the prohibition of use to help prevent future contamination of Wisconsin's groundwater. OEC also staffs and coordinates work with sister agencies in the Great Lakes, and with partner organizations such as ECOS and ITRC, to share information, research, advisories, and other activities.

Remediation and Redevelopment Program

The Remediation and Redevelopment (RR) program has primary responsibility for implementing and aiding cleanups under the Spill Law, the Environmental Repair Law, the Land Recycling Law, federal programs (Superfund, Hazardous Waste Corrective Action and Closure, Leaking Underground Storage Tanks (LUST)), brownfields properties, the Drycleaner Environmental Response Program, contaminated sediments and at closed landfills. The RR program provides technical assistance, clarifies legal liability, provides financial assistance and provides technical project oversight of cleanup projects.

All cleanups are conducted according to the ch. NR 700 rule series, Wis. Adm. Code, Investigation and Remediation of Environmental Contamination, and ch. NR 140, Groundwater Quality. The majority of cleanups are done by persons responsible under the law, or persons or groups involved in the redevelopment of potentially contaminated properties. Program staff provide technical assistance on cleanups conducted by consultants at the direction of responsible parties. In addition, RR staff contract and direct consultants on state- and federally-funded cleanups and assessments. The RR Program also provides assistance for spill response; and works with other agencies, particularly the U.S. EPA Removals Program, for conducting major spill response actions and removal of hazardous substances when the responsible party is unable or unwilling to do so and there is a risk to public health, welfare, or to the environment. The RR program is also responsible for assisting the EPA with the remediation of contaminated sediments in the Great Lakes areas of concern.

Cleanup of Groundwater Contamination

In FY21 the program spent approximately $1,500,000 in Environmental Fund dollars to initiate or continue environmental cleanup actions at over 30 locations where groundwater contamination is known or suspected. In FY22, this amount increased to approximately $2,000,000 due to temporary emergency water costs of approximately $500,000 per year for the town of Campbell beginning in March 2021. The Environmental Fund is used when contamination is significant, but no identifiable private party has legal responsibility for the contamination, the person(s) legally responsible do not have the financial ability to proceed, or the responsible person simply refuses to proceed. Private contractors conduct these investigations and cleanups with oversight by DNR staff. Whenever feasible, the RR program and legal staff attempt to recover costs from responsible persons after the cleanups are undertaken. In addition to these "state-lead" projects, the RR program uses Environmental Fund dollars to cleanup emergency spills to prevent additional groundwater contamination.

Investigation, Cleanup and Redevelopment of Brownfields

Brownfields are abandoned, idle or underused industrial or commercial facilities or sites whose expansion or development is adversely affected by actual or perceived environmental contamination. The RR program coordinates several efforts to encourage local governments and private businesses to cleanup and redevelop brownfield properties. At many brownfields sites, the release of hazardous substances threatens groundwater quality.

Program staff assist local governments and private businesses with the cleanup and redevelopment of brownfields by providing technical assistance. The RR program provides a number of different types of assurance, comfort, or general liability clarification letters related to properties with groundwater contamination, as well as other contaminated media, depending on the site-specific circumstances. Collectively, these letters facilitate the reuse and development of properties. Since 1994, the RR program has provided thousands of redevelopment assistant reviews – which can include liability clarification letters, off-site exemption letters, cleanup agreements for tax delinquent properties, building on abandoned landfill approvals, etc. – at brownfield properties throughout the state.

The RR program also continues to assist parties with voluntary investigations and cleanups of brownfield properties through the Voluntary Party Liability Exemption (VPLE) process. Many sites that follow the VPLE process have contaminated groundwater.

In the VPLE program, after a person has conducted an environmental investigation of the property and cleaned up contamination, the DNR can issue a "Certificate of Completion" which provides a release from future liability for any discharge that occurred on the property prior to approval of the investigation and cleanup of that discharge. Since 1994, the DNR has issued over 200 certificates of completion. One site, for which a Certificate of Completion was issued, discovered that additional hazardous substances existed. In this case, the owner chose to remove the contaminated material with the DNR approval.

Dry Cleaner Environmental Response Fund (DERF) Program

The DERF program reimburses dry cleaner owners and operators for eligible costs associated with the cleanup of soil and groundwater at sites contaminated by dry-cleaning solvents. Fees paid by the dry-cleaning industry provide program funding. Environmental cleanups at dry cleaner sites are conducted following the ch. NR 700 rule series. There are 221 sites in the program with 101 at various stages of investigation and cleanup and 120 sites closed. The program is implemented through ch. NR 169, Wis. Adm. Code.

Tracking System and GIS Applications

The program's main database on the status of sites undergoing investigation and/or cleanup is the Bureau of Remediation and Redevelopment Tracking System (*BRRTS*).

In 2001, revisions to ch. NR 726, 716, 749, 811, and 812 implemented requirements to list sites with residual groundwater contamination on the database to replace the requirement to record groundwater use restrictions at the County Register of Deeds Office. In 2002, additional rule revisions required the inclusion of sites with residual soil contamination on the database. In 2006, the spill law was amended (see s. 292.12, Wis. Stats.) to expand the use of the DNR's databases to track sites with residual contamination left in place at the time of case closure. The database currently includes locational information on open sites, sites closed with no residual contamination, sites closed with residual groundwater contamination above the ch. NR 140 enforcement standards and sites closed with soil contamination above ch. NR 720 soil standards, sites closed with other engineering or institutional controls, and brownfields properties, as well as site specific information pertaining to investigation and cleanup of each property.

Information in the database is available through BRRTS on the Web (BOTW). This internet-accessible application provides information to future owners or users of the property of the existence of soil and/or groundwater contamination, as well as any responsibilities of the property owner (or occupant in some cases) to comply with any conditions of closure. The site-specific information is attached to each site by a link to a pdf.

In 2005, an expanded GIS application was made available, called the *RR Sites Map*. This application shows the locations of the majority of sites available on BRRTS (open and closed). In 2008, additional data regarding financial tools and liability clarification actions were added. In June of 2013, RR Sites Map was migrated to Geocortex where it obtained a new look but kept the same functionality.

RR Sites Map is linked to BRRTS on the Web and is useful for locating potential contamination sites when evaluating new municipal well placement or for property transactions. The database makes site specific information on open and closed remediation sites much more available and accessible to the public and specific interested groups, particularly those wanting to install or replace a potable well on an affected property, as well as those buying properties. Sites regulated by the Department of Agriculture and Trade and Consumer Protection (DATCP) are also included in BRRTS on the Web and RR Sites Map.

A well driller or well constructor should consult with the department prior to drilling in areas where the driller has been notified or determines that there are contaminated formations or groundwater contamination levels in excess of the standards specified in s. NR 812.06, or prior to drilling a well on a property identified by the department as having residual contamination and continuing obligations requiring listing on the department's database to determine if additional casing or other construction techniques may be required.

The RR Program continues to make improvements to both BOTW and RR Sites Map. In addition to the ongoing programming efforts, work continues on quality assurance and quality control (QA/QC) of existing data.

Waste and Materials Management Program

Monitoring Groundwater Quality Around Landfills

The Waste and Materials Management Program (WA) implements the DNR's Groundwater Standards Program in several ways during the life of a landfill. When staff review an applicant's "Feasibility Report," which proposes to site a landfill at a particular location, they review baseline groundwater data submitted by the applicant to determine whether exemptions and alternative concentration limits (ACLs) to the established ch. NR 140 groundwater standards are needed for the public health and welfare parameters, based on the concentrations of those substances present in the groundwater before landfill development. In addition, reviewers establish preventive action limits (PALs) for indicator parameters based on statistical calculations of the baseline concentrations.

During the active life of a landfill and after closure, staff review routine groundwater detection monitoring data, collected and submitted by the landfill owner at sites where monitoring is required to determine compliance with ch. NR 140 standards and site-specific ACLs and PALs. Ch. NR 140 provides a list of response actions that the DNR may require a facility to take after a groundwater standard exceedance is confirmed. When conditions warrant, staff require groundwater investigation reports that include proposals for further evaluations and recommendations for remediation at landfills that cause groundwater standards to be exceeded. Staff review results of site investigations triggered by the exceedances of groundwater standards and evaluate the effectiveness of remedial actions at active solid waste facilities and closed landfills by comparing results to groundwater standards and by looking at concentration trends over time.

WA accepts only electronic submittal of environmental monitoring data from landfill owners, labs and consultants. The electronic data submittals are currently uploaded by the DNR to the WA Groundwater and Environmental Monitoring System (GEMS) database. WA provides public access to the environmental monitoring data contained in GEMS through "GEMS on the Web." In addition to enhancing GEMS on the Web to allow more flexibility in choosing a specific date range and particular monitoring points, WA is seeking resources to program a web interface, possibly using the department's Data Portal or Web Access Management System, so that facilities can upload environmental monitoring data into GEMS.

The WA Program is placing stronger emphasis on having facilities collect water samples for VOC analysis, rather than for indicator parameters, in exchange for a reduced sampling frequency. VOCs are a key contaminant used to determine water supply well vulnerability to contamination and set monitoring requirements.

Bags of pharmaceuticals collected by Jefferson County as part of an effort to keep pharmaceutical waste out of the groundwater. *Photo credit: Barbara Bickford*

The WA Program updated its guidance titled, Reducing or Terminating Monitoring at Landfills, in 2020 (Pub-WA-1013-2019). More closed landfills in the state are reaching the end of their owner financial responsibility period. Groundwater monitoring data has been collected for decades at these sites and for those sites which the groundwater data show little to no impact to groundwater quality from the landfill, owners often express an interest in reducing or terminating monitoring to reduce costs. This guidance provides information to landfill owners and consultants on how to evaluate whether the monitoring data collected from their landfill and site-specific conditions support reducing or terminating monitoring, and it discusses whether additional data should be collected. The guidance provides a consistent and objective process and set of criteria for evaluating whether reducing or terminating monitoring is warranted so that it can be done in a manner protective to the groundwater.

The WA has been placing landfill locations on a GIS mapping program called the *WA Sites Viewer*, which includes delineating waste boundaries and locating monitoring wells where known. This information is shared with the DG Program and licensed well drillers to aid well drillers in siting a water supply well. At this time, almost all of the known landfills have been placed on the GIS mapping program. This GIS program has been an important tool to increasing compliance with the 1,200 foot set-back requirement to a landfill and for the NR 812 well variance application requirement, if the set-back cannot be met.

WA continues to be a participant in the Interagency Pharmaceutical Waste Working Group, with the DATCP and other partners. Keeping pharmaceuticals out of household and industrial waste streams is the main way to reduce the risk that the substances will reach groundwater through land spreading or septic systems.

Environmental Analysis and Sustainability Program

Monitoring Groundwater Quality Around Metallic Mines

The Environmental Analysis and Sustainability Program regulates metallic mining activity in the state. Issues related to groundwater quantity and groundwater quality are critical in determining whether a proposed mining project receives necessary approvals. State statutes have created separate approval processes for non-ferrous mining projects (Ch. 293, Wis. Stats.) and ferrous mining projects (Ch. 295, Wis. Stats.). The regulatory framework for ferrous mining projects includes provisions related to groundwater

withdrawals, mining waste site design and operation and protection of groundwater quality. The law requires compliance with existing groundwater quality standards but establishes point of standards application and evaluation processes and criteria that are unique to ferrous mining projects.

Water Quality Program

The Bureau of Water Quality (WQ) is responsible for statewide implementation of the DNR's groundwater standards primarily through the issuance of discharge permits to facilities, operations and activities that discharge treated wastewater and residuals to groundwater.

Wastewater Discharges

WQ issues Wisconsin Pollutant Discharge Elimination System (WPDES) permits to all communities, industrial facilities and large privately-owned wastewater systems which discharge treated domestic or industrial wastewater to groundwater through land treatment/disposal systems. These systems are primarily spray irrigation, seepage cell, subsurface absorption systems and ridge & furrow treatment systems regulated under ch. NR 206, Wis. Adm. Code (domestic wastewater) and ch. NR 214, Wis. Adm. Code (industrial wastewater). WPDES permits issued to these facilities contain groundwater monitoring and data submittal requirements that are used to evaluate facility compliance with ch. NR 140, Wis. Adm. Code (groundwater quality standards). Groundwater monitoring systems at existing facilities are evaluated and upgraded as necessary at permit re-issuance.

The DNR also regulates the land application of organic industrial wastes, municipal biosolids and septage (chapters NR 214, 204, and 113) through approval of land spreading sites and requirements on locations, loading rates, nutrient levels and time of year. In recent years, as the quantities of these materials and agricultural manure have increased, competition for acceptable land spreading sites has increased, particularly in some areas of the state. Some instances of unacceptable impacts to groundwater have occurred associated with these activities. In addition, the DNR has pushed land spreading entities to provide for more storage capacity to minimize winter and spring runoff to surface water. As a result, wastewater generators and haulers have sought to utilize existing tanks and lagoons, and in some cases, substandard earthen manure pits or substandard storage tanks. The industrial wastewater program has affirmed code requirements to ensure older structures meet the standards needed to assure storage is environmentally sound, protective of both groundwater and surface water.

WQ maintains a database, designated the System for Wastewater Applications, Monitoring, and Permits (SWAMP), for holders of specific WPDES and general permits. This database system stores facility-specific information such as address, contacts, location, permit requirements, monitoring results and violations of permit requirements for private and municipal wastewater treatment facilities. The system contains current information on groundwater, wastewater and biosolids treatment and management. Historical sampling data from groundwater monitoring wells is available through the system and current sample results are added on a monthly basis. Sampling results and

site loading information are also available for land application of municipal biosolids, septage and industrial sludge, by-product solids and wastewater.

WQ assists and participates in local planning efforts for existing developed areas (served by onsite wastewater treatment systems) that are investigating the possibility of providing a public sewerage system.

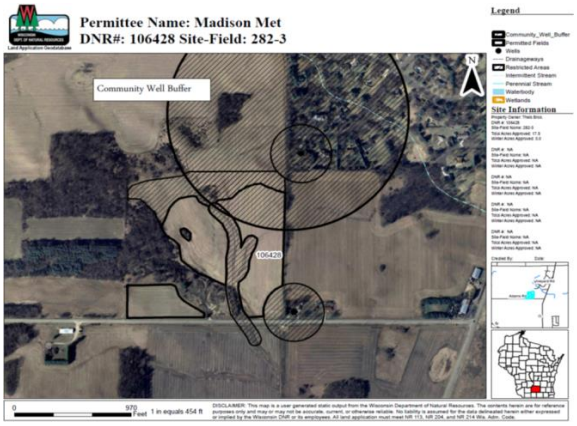
WQ issues WPDES general permits to a group of facilities with similar low-flow nondomestic wastewater, domestic wastewater, or mixed wastewater discharges to a subsurface soil absorption system pursuant to s. NR 205.08, Wis. Adm. Code. These facilities can apply coverage under either one of the following generals permits: Domestic Wastewater to a Subsufurce Soil Absorption System or Industrial Liquid Waste to a Subsurface Soil Absorption System. Both of these general permits were reissued in 2019. These general permits together currently cover 41 facilities. The requirements for requesting coverage under the general permits require the DNR to review the facility operating conditions (e.g. flow volume and pollutants), site restrictions and setback distance requirements of the systems to determine if the facility is applicable under these general permits. Also any proposed new or modifications to these systems are required to have the design plans reviewed and approved by the DNR pursuant to s. 281.41, Wis. Stats. Facilities covered under the general permits are required to monitor the discharges for flow and other pollutants. These general permits are renewed every five years. The renewal process for general permits allows the DNR to reevaluate if the facilities are still eligible for coverage under the permit and review land use changes that may have occurred. For instance, if there were changes due to installation of new water supply wells in the area during the previous permit period. These review processes and permit required monitoring allow the DNR to track protection of groundwater quality and public health and could also identify future concerns and permit needs.

Septage and Sludge Management

WQ implements the regulations in chapters NR 113, NR 204, and NR 214, Wis. Adm. Code. Ch. NR 113 relates to septage management and ch. NR 204 govern the treatment quality, use and disposition of municipal wastewater treatment plant sludge. Ch. NR 113 and ch. NR 204 incorporate federal septage and sewage sludge standards. WQ regulates the land application of industrial sludge, liquid wastes and by-product solids through ch. NR 214. Chapters NR 113, NR 204, and NR 214 contain treatment quality standards and land application site requirements and restrictions that are designed to prevent runoff to surface water or leaching of nutrients and pollutants to groundwater.

Results of federal and state septage audits identified the need for compliance training in the area of septage management. Cooperation with the U.S. EPA led to the on-going creation of better training tools and implementation of numerous compliance classes. Recent septage operator certification code changes in ch. NR 114 now require minimum compliance training of all certified septage operators in their continuing education requirements cycles to ensure a compliance focus. New classes and training segments are currently offered through various associations, county updates and stand-alone classes.

Inter-division work with the Bureau of Law Enforcement will continue to be necessary and likely increase as the industry continues to explore more options for waste disposal and re-use during these difficult economic times and "green" transformation. Unfortunately, many of these options can cause significant harm to waters of the state. Continued enforcement efforts are necessary to deter further significant environmental harm. Increasing the number of audits is intended to preempt significant operations that create long-term harm of the environment. Also, efforts are underway to systemize audits to minimize the intrusion to the permitted community, but allow ample discussion to provide educational opportunities if needed.



Clearer, more easily-produced maps in permits to land-apply wastes now help protect community and school water supply wells.

WQ continues to implement a statewide computer system that records and monitors treatment and disposal of municipal sludge, septage and industrial land-applied wastes. This system includes an inventory and a history of all sites used for land application. Wisconsin became the fourth state delegated authority by U.S. EPA to implement municipal sludge regulations, through its delegated NPDES (WPDES) permit program, in July of 2000. WQ has improved land spreading staff review for land spreading sites with current computerized mapping data provided by the Natural Resource Conservation Service(NRCS). The site evaluation and approval process now includes providing maps to the land application entities land applying septage, sewage sludge and industrial land-applied wastes. These maps show clear boundaries for approved areas to further protect surface and groundwaters.

Wisconsin Act 347 provides incentives for more wastewater treatment plants to accept and treat septage. This is accomplished through the offer of a zero percent Clean Water Fund loan for the planning and construction of receiving facilities and additional capacity provided for septage. Facilities which are upgrading capacity by more than 20% must evaluate septage generation and available disposal options in their planning area during facility planning. Although they are not mandated to provide such capacity, they are offered the zero percent loan if they do so. Structures are provided by which publicly owned treatment works establish costs for receipt of septage and a process is laid out for dispute resolution when such costs are questioned. Land application also remains a viable option when appropriate and Act 347 provides explicit pre-emptive authority to the state by disallowing restrictive local ordinances if they are not identical to state regulations.

Watershed Management Program

The Bureau of Watershed Management (WT) is responsible for statewide implementation of the DNR's groundwater standards primarily through the issuance of discharge permits to concentrated animal feeding operations (CAFO) and dischargers of contaminated storm water. Field staff carry out compliance and enforcement activities using policies, codes, and guidelines intended to meet groundwater quality standards. Integrated basin

planning, carried out in the field under guidelines developed by WT, assess and evaluate groundwater (as well as surface water) and provide general and specific recommendations for the protection and enhancement of the basin's groundwater.

Agricultural runoff and groundwater quality

Chapter NR 243 Wis. Adm. Code covers WPDES permit requirements for livestock operations and contains provisions to protect surface water, groundwater and wetlands in Wisconsin. Revisions made to ch. NR 243 have improved groundwater protection associated with CAFO land application practices by increasing setback requirements from community/non-community public wells and karst features and by further restricting winter applications of manure. Nutrient management plans submitted as part of the issuance of WPDES permits to CAFOs address how, when, where, and in what amounts CAFOs apply manure, process wastewater, and associated nutrients to cropped fields to protect surface waters and groundwater. Groundwater monitoring has been conducted voluntarily and required at selected production sites and land application fields. The DNR also promotes groundwater protection through the implementation of agricultural performance standards and prohibitions in ch. NR 151, Wis. Adm. Code, the issuance of Notices of Discharge under ch. NR 243, and response to acute manure related groundwater impacts (e.g., well contaminations).

By the end of 2021, there were 321 permitted CAFOs – 310 large CAFOs, 10 medium CAFOs, and 1 small CAFO. Over 90% of the permitted CAFOs are dairy operations. The trend of growing numbers of permit applications for larger-scale livestock operations is expected to continue.

Sections NR 151.07 and ATCP 50.04(3), Wis. Adm. Code, require all crop and livestock producers to develop and implement nutrient management plans. Technical Standard NRCS 590 contains planning and implementation requirements for all nutrient management plans. In 2015, DNR staff participated in a NRCS effort to update its technical standard for nutrient management plans to reflect new federal water quality protection criteria, including a nitrogen loss risk assessment.

Federal, state, and local agencies maintain technical resources and expertise to implement NRCS Standard 590, including development and dissemination of the field-based Soil Nutrient Application Program (*snapplus.wisc.edu*) in cooperation with the University of Wisconsin. Implementation of the Chapter NR 151 performance standard cannot be required without cost sharing in many situations. A multi-partner conservation consortium was effective in securing cost share resources from the Legislature to help farmers meet nutrient management plan requirements. DATCP administers these funds through its Soil and Water Resource Management Program. In addition, the NRCS provides cost sharing for development and implementation of comprehensive nutrient management plans, including 590 compliant planning and implementation. In other situations, cost sharing does not have to be provided to require compliance. This includes compliance for farms operating under a WPDES Animal Feeding Operation Permit, farms receiving state farmland preservation tax credits under the state's Farmland Preservation Program, livestock operations obtaining local permits under the state Livestock Siting Law, and

livestock operations required by county regulation to develop and implement a nutrient management plan when voluntarily applying for a manure storage permit to cover new or altered manure storage facilities.

As part of the effort to protect drinking water and public health in areas of the state vulnerable to pathogen contamination of groundwater, the Department of Natural Resources worked with key public and agriculture industry stakeholders, state agencies, the State Legislature, the governor and the general public to update ch. NR 151, Wis. Adm. Code. The NR 151 rule modification developed the Silurian Bedrock performance standards to address land spreading of manure on soils in sensitive areas of the state - i.e. where depth to bedrock is shallow and the bedrock is fractured (also described as karst topography).

Storm Water and groundwater quality

Storm water discharges are regulated as required under the federal Clean Water Act under ch. NR 216, Wis. Adm. Code. Chapter NR 216 requirements include: 1) permits for about 245 municipalities in Wisconsin to control polluted runoff that may enter their municipal separate storm sewer systems (MS4s); 2) permits for owners of construction sites with one or more acre of land disturbance to control erosion during construction and to install practices to limit post-construction pollutant discharge after construction is completed; and 3) permits for certain industrial facilities to address potential contamination of storm water from outside activities and outdoor storage of materials.

In addition, under ch. NR 151, Wis. Adm. Code, the DNR has developed runoff performance standards for MS4s and construction sites that are implemented through the storm water permit program. Chapter NR 151 was updated and those changes became effective on January 1, 2011.

Provisions to implement Chapter NR 216 and the performance standards in Chapter NR 151 are included in several general permits. The MS4 general permit for municipal storm water discharges was first issued on in January 2006. The MS4 general permit was reissued in May 2014.

In 2020, six general storm water permits expired requiring revisions and reissuance. Five of the industrial general permits expire including the scrap metal and auto recycling permits at the end of March, the Tier 1 and Tier 2 industrial permits May 31, the non-metallic mining general permit August 31 and the construction site general permit August 31. The urban runoff team worked extensively with internal staff, external stakeholders and the US EPA to develop general permits that meet the standards of the Clean Water Act and Wisconsin Statues in compliance with the department's delegated Wisconsin Pollutant Discharge Elimination System (WPDES) authority.

Chapter NR 216, Wis. Admin. Code establishes criteria defining those storm water discharges needing WPDES storm water permits, as required by s. 283.33, Stats., and to implement the appropriate performance standards of sub chs. III and IV of ch. NR 151. Chapter NR 216 identifies which industrial facilities, construction sites and municipalities require WPDES storm water permits, application requirements, and storm water discharge

permit criteria for each type of facility. In 2020, the department undertook an effort to re-write certain parts of NR 216. Specific efforts were made to finalize concerns raised by the US EPA in its 2011 75 issues letter related to legislative authority, to respond to the federal "remand rule" and proposes a realignment of the fee structure for construction site erosion control permits. The department is preparing the final rule package for review by the Natural Resources Board.

For more information

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